

REMARKS

Status of the Claims

Claims 1-7 and 16-20 are pending in this application.

Claims 1-7 and 16-20 are rejected.

Claims 8-15 are withdrawn.

Claims 1 and 16 have been amended. Support for these amendments can be found throughout the specification, claims, and drawings, as originally filed.

Specification Objections

The Office Action objected to the disclosure as containing what appears to be a typographical error at page 10, line 8. Applicant kindly thanks Examiner Ho for pointing out this error. Applicant has submitted a rewritten paragraph [0030] which amends the specification to change numeral "28" to recite "128". Applicant respectfully requests removal the objection.

Rejection of Claims 1, 2, 7, 16, and 17 Under 35 U.S.C. § 102(b)

Claims 1, 2, 7, 16, and 17 stand rejected under 35 U.S.C. §102(b) as being clearly anticipated by U.S. Patent No. 5,511,639 issued to Sherman (hereafter Sherman '639). The Office Action indicated that Sherman '639 discloses:

a transfer case/gear box assembly (See Fig. 1) comprising: an input shaft 44; an output shaft 62 selectively coupled to the input shaft; a planetary gear assembly 56 for transferring drive torque from the input shaft to the output shaft, said planetary gear assembly including a sun gear 54, a ring gear 58 and a plurality of pinion gears 64 mounted to a common carrier 60, said sun gear and said ring gear meshing with the plurality of pinion gears; a direct clutch assembly 14 including a first set of clutch plates 40 and a second set of clutch plates 46, wherein when the clutch assembly is activated, the first and second set of clutch plates are coupled together;

and a drum and band assembly 12 including a drum and a band 22, wherein the band is engaged to prevent the drum from rotating, and wherein the combination of the planetary gear assembly, the direct clutch assembly and the drum and band assembly provide an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio (col. 3, lines 4-5 and col. 4, lines 38-42).

With respect to claims 2 and 17, the Office Action also stated:

wherein the input shaft is coupled to the ring gear, the output shaft is coupled to the carrier and the sun gear is coupled to the first set of clutch plates on the drum, and wherein engaging the band couples the sun gear to the ground 30 to provide the underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft. Regarding claim 7, wherein the under drive gear ratio or the overdrive gear ratio is selectively engaged automatically (via the transmission control 66).

The Applicant respectfully traverses the 35 U.S.C. § 102(b) rejection of claims, and maintains that Sherman '639 does not anticipate each and every element of claims 1, 2, 7, 16, and 17. Applicant requests reconsideration of the rejection based on the following remarks.

In order for the 35 U.S.C. § 102(b) rejection to be properly maintained, each and every element of the claim must find exact correspondence in the Sherman '639 patent. Applicant respectfully submits that claims 1 and 16 have been amended include the limitation that the input shaft is "coupled to the transmission of a vehicle," and the limitation that the gearbox/transfer case "combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio." Applicant submits that Sherman '639 does not disclose this limitation. Sherman '639 discloses a clutch and brake assembly, generally designated 10, which includes a brake assembly 12 and a clutch assembly 14. Col. 2, Lines 27-30. The clutch assembly 12 and the brake assembly 14 are used to provide different ratios from input to output. The ratio

change is controlled by a conventional transmission control 66 which includes both hydraulic and electronic devices operating in a well known manner to provide the ratio interchange as desired by the sampling of various vehicle parameters, such as engine speed, vehicle speed, and throttle setting. Col. 3, Lines 10-15. The invention disclosed in Sherman '639 is a transmission, not a gearbox or transfer case, and is not used in combination with a vehicle transmission to provide and extend gear ratios as disclosed in claims 1 and 16. Sherman '639 specifically mentions how in some transmissions, the brake assembly 12 may also be utilized for a higher ratio, such as an overdrive condition, in which case the valve 68 is conditioned to permit the brake assembly to be energized when the overdrive condition is requested. Col. 4, Lines 38-42. Claims 1 and 16 now recite "an input shaft coupled to the transmission of a vehicle." For this reason, Applicant maintains that Sherman '639 does not disclose all the limitations of claims 1 and 16, therefore, removal of this rejection is respectfully requested.

With regard to the rejection of claims 2, 7, and 17, Applicant wishes to point out that claims 2 and 7 are dependent upon claim 1, and claim 17 is dependent upon claim 16. Applicant submits that claims 1 and 16 are not anticipated under 35 U.S.C. § 102(b) by Sherman '639. Claim 2 contains the limitation of "engaging the band couples the sun gear to ground to provide the underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft," and claim 7 contains the limitation of "the underdrive gear ratio of the overdrive gear ratio is selectively engaged either automatically or by a operator input switch." Taking claims 2 and 7 taken in combination with claim 1 further define over Sherman '639, and are likewise not anticipated by Sherman '639. Claim 17, which contains the limitation of "engaging the band couples the sun gear to ground to provide the

underdrive gear ratio from the ring gear through the carrier to the output shaft, and wherein activating the clutch assembly couples the sun gear to the ring gear to provide the direct drive gear ratio from the input shaft to the output shaft," taken in combination with claim 16 also further defines over Sherman '639 and is likewise not anticipated by Sherman '639. Applicant respectfully requests the removal of the rejections for claims 2, 7, and 17.

Furthermore, Applicant notes that the specification and drawings of Sherman '639 do not teach or suggest a transfer case or gearbox used in combination with a transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio. For this reason Applicant maintains that Sherman '639 would also not render obvious claims 1, 2, 7, 16, and 17 of the present application. Therefore, it is respectfully submitted that the claims are properly patentable over Sherman '639.

Rejection of Claims 3-5 and 8-20 Under 35 U.S.C. § 103

Claims 3-5, and 18-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Sherman '639 in view of U.S. Patent 3,908,485 issued to Miyauchi et al (hereafter Miyauchi '485). In order for the proposed references to be relied upon, a person having ordinary skill in the art at the time of the invention must have been motivated to modify and combine the references based upon the teachings of those references.

The Office Action stated:

Sherman '639 does not specify the transfer case/gear box assembly having gear ratios as recited in claims 3-5 and 18-20. It is old and well known in the art that the gear ratio can be changed by changing the number of teeth of gear components of the planetary gear. The evidence is shown in the Miyauchi et al reference (see col. 9, lines 11-14). It would

have been obvious to one of ordinary skill in the art at the time the invention was made to change the number of teeth of the gear components in the planetary gear of Sherman to have the gear ratios as recited since Examiner takes an Official Notice that the gear ratio can be changed by changing the number of teeth of gear components of the planetary gear is old and well known in the art (see Miyauchi et al reference, col. 9, lines 11-14).

Applicant notes that claims 3-5 are ultimately dependent upon claim 1 and therefore contain all of the limitations of claim 1; claims 18-20 are dependent upon claim 16 and therefore contain all of the limitations of claim 16. Claims 3-5 and 16 now contain the limitations of "an input shaft coupled to the transmission of a vehicle." Claims 3-5 now contain the limitation of the transfer case being used to "provide a selectable gear ratio where the gear ratio of said transfer case assembly combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission." Claim 16 now contains the limitation of the gearbox being used to "provide a selectable gear ratio where the gear ratio of the gear box assembly combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission." As indicated above, Sherman '639 does not teach or suggest these limitations, therefore, Miyauchi '485 must teach or suggest these limitations or the rejection will fall.

Sherman '639 teaches or suggests a clutch assembly 14 and brake assembly 12 to provide an underdrive, direct drive, or overdrive condition in a transmission. The clutch assembly 14 and brake assembly 12 are used to provide different gear ratios in a transmission, and are not used to provide a selectable gear ratio where the gear ratio of the gear box or transfer case assembly is combined with the vehicle transmission.

Miyauchi '485 also does not teach or suggest how gear box or transfer case assembly "combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission."

The specification and drawings of Miyauchi '485 teach an automatic power transmission and a hydraulic control system. Figure 3 teaches how an automatic power transmission is shown to largely consist of a transmission case which is generally designated by reference numeral 10, a torque converter 12, an oil pump 14, a transmission input shaft 16, a first or front clutch 18, a second or rear clutch 20, first, second, and third planetary gear sets 22, 24, and 26 respectively, a low-and-reverse brake 28, a second-speed coasting brake 30, a second-speed-driving brake 32, a band brake 34, a low-one-way clutch 36, a second-speed one-way clutch 38 and a transmission output shaft 40. Col. 6, Lines 41-50. The specification of Miyauchi '485 teaches different gear ratios for a transmission, it does not teach or suggest the use of a transfer case or gear box to provide a selectable gear ratio where the gear ratio of the gear box or transfer case assembly "combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission."

Applicant submits that claim 3 contains the limitation of how "the underdrive ratio is 1.61:1," claim 4 contains the limitation that "the underdrive gear ratio provides an overall gear ratio range of 5.32:1 in combination with a vehicle transmission," and claim 5 contains the limitation that "the transfer case provides an underdrive gear ratio or an overdrive gear ratio selected from the group consisting of 2.64:1, 1.61:1, 0.60:1, 0.40:1, 2.48:1, 1.67:1 and 0.60:1." These limitations taken in combination with claim 1 are not

taught or suggested by the patents cited in the Office Action. Miyauchi '485 does not teach or suggest any of the gear ratios taught by claims 3-5. Additionally, claim 18 contains the limitation that "the underdrive ratio is 1.61:1," claim 19 contains the limitation that "the underdrive gear ratio provides an overall gear ratio range of 5.32:1 in combination with a vehicle transmission," and claim 20 contains the limitation that "the transfer case provides an underdrive gear ratio or an overdrive gear ratio selected from the group consisting of 2.64:1, 1.61:1, 0.60:1, 0.40:1, 2.48:1, 1.67:1 and 0.60:1." Applicant submits that these limitations taken in combination with claim 16 define over the patents cited in the Office Action, and are not taught or suggested by Sherman '639 in view of Miyauchi '485. Specifically, Miyauchi '485 does not teach or suggest any of the gear ratios as taught by claims 18-20. Removal of the rejection is respectfully requested.

The Office Action also stated that claim 6 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Sherman '639 in view of U.S. Patent 6,612,959 issued to Frost (hereafter Frost '959).

With regard to Frost '959, the Office Action stated:

Sherman does not specify the transfer case providing a vehicle drive mode for all-wheel drive and two-wheel drive. Frost shows a transfer case 22 providing a vehicle drive mode for all-wheel drive and two-wheel drive (see col. 2). It would have been obvious to one of ordinary skill in the art at the time the invention was made to have the transmission of Sherman to provide a vehicle drive mode for all-wheel drive and two-wheel drive as taught by Frost in order to make the transmission of Sherman useful for a particular vehicle, e.g. an all-wheel drive vehicle.

Applicant notes that claim is 6 dependent upon claim 1 and therefore contains all of the limitations of claim 1. Claim 6 requires "an input shaft coupled to the transmission of a vehicle", and that the gearbox or transfer case assembly "combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in

addition to gear ratios provided by said transmission.” Sherman ‘639 does not teach or suggest this limitation, therefore, Frost ‘959 must teach or suggest this limitation or the rejection will fall.

Frost ‘959 does not make up for the deficiencies left by Sherman ‘639. Frost ‘959 teaches a three-speed transfer case for use in four-wheel drive vehicles. Col. 2, Lines 7-9. A controller 52 receives sensor signals from vehicle sensors 54 and a mode signal from a mode select mechanism 56 for use in controlling actuation of a hydraulic control system 58 in response to a particular drive mode selected by the vehicle operator. Col. 3, Lines 37-41. Frost ‘959 also teaches that shifting between the high-range mode and the overdrive mode may be controlled automatically in coordination with controlled shifting of transmission 20. Col. 9, Lines 6-9. Thus, the transfer case 22 permits selection of high and low speed ranges as well as providing an overdrive ratio that permits establishment of an additional forward gear ratio in conjunction with transmission 20. Col. 9, Lines 10-13. Frost ‘959 does not teach or suggest how a gear box or transfer case assembly “combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission.” The transfer case as taught by Frost ‘959 is used to selectably engage a set of planetary gears and clutches to provide various operating ranges for a four-wheel drive vehicle, with an alternate embodiment providing for an additional forward gear ratio in conjunction with the transmission. Frost ‘959 does not teach or suggest how a transfer case assembly “combines with the vehicle transmission to extend the gear ratio range of the vehicle by providing an underdrive gear ratio and a direct drive gear ratio or an overdrive gear ratio and a direct drive gear ratio in addition to gear ratios provided by said transmission” as taught by claim 1.

Applicant submits that Sherman '639 in view of Frost '959 does not teach or suggest the inventive combinations of the elements of claim 6, which includes all of the limitations of claim 1. Therefore, Applicant respectfully requests removal of the rejection of claim 6 and allowance thereof.


Sherman '639 in view of Miyauchi does not teach or suggest the inventive combination of claims 3-5 and 18-20 of the present invention as required by 35 U.S.C. § 103(a). Additionally, Sherman '639 in view of Frost also does not teach or suggest the inventive combination of claim 6 of the present invention as required by 35 U.S.C. § 103(a). Removal of these rejections is respectfully requested.

CONCLUSION

It is respectfully submitted that in view of the above amendments and remarks claims 1-7 and 16-20 are allowable. Therefore Applicant submits that the pending claims are now properly allowable, which allowance is respectfully requested. The Examiner is invited to telephone the Applicant's undersigned attorney at (248) 364-4300 if any unresolved matters remain.

Respectfully submitted,

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